TRP-C37M
User's Manual

MODBUS TCP to RTU/ASCII Gateway

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1. Introduction

TRP-C37M is an industrial environmental Modbus TCP to RTU/ASCII Gateway with wide range power inputs and serial communication protection, built-in surge and over current protection ensuring long distance serial quality. The RS485 interface built-in hardware decoder ensures RS485 data without loss. The hardware keeps on line RS485 device working fine; Built-In watchdog function will auto reset when system fail or power fails. External switch ensures loss of password or IP that can be easily reset back to factory settings.

The TRP-C37M operates in “Direct IP Mode”, “Virtual COM Mode”, and “Paired Mode”, The Ethernet port supports Auto-MDIX and Auto-select 10/100MB. TRP-C37M also offers a Heart Beat feature to ensure a reliable communicating connection.

TRP-C37M also offers the maximum connection 16 host client to link the one Serial Gateway that is easy to operate in Modscan32 and Modbus Poll application uses TCP mode, Virtual-COM mode and Pair Mode.

The TRP-C37M provides a watchdog timer function, The Watchdog timer allows the system to automatically recover from a system crash. When the TRP-C37M MCU stop working correctly, the watchdog timer waits for a preset period of time, and the performs a hardware reset.
When TRP-C37M working at industrial environment, if the voltage is unstable, The TRP-C37M built-in power detection circuit can prevent the power fail cause of the system boot fail.

1-1 Features

- Wide input range DC power supply.
- Built-In watchdog function prevents system boot fail.
- Support Auto-MDIX twisted pair crossover detection and Auto-Correction.
- Maximum Connection 16 Client PC at Server Mode.
- Auto fast direction RS485 flow control by hardware.
- Surge protection and over current and over voltage on RS-422/485 data lines.
- Support baud rate from1200~921600Kbps.
- Auto switching RS-232/422/485 signal interface.
- Virtual COM drivers for Windows 98/WIN2000/WIN XP/Vista/WIN2003/WIN 7.
- Virtual Com Support Server, Client, UDP mode.
- Virtual Com Support Modscan32 or Modbus Poll utility.
- Fully compatible with Ethernet and TCP/IP protocol.
- Supports 10/100 Mbps Ethernet.
- Power/Link/UART RX/UART TX mode LED indicator.
- Heart Beat function ensures a reliable communicating connection.
- Auto reconnection when power or Ethernet fail.
- Support configuration by serial console.
- Back to factory configuration by external switch.

- Update the firmware from LAN.
- Dual power input select from screw terminal or DC-Jack.

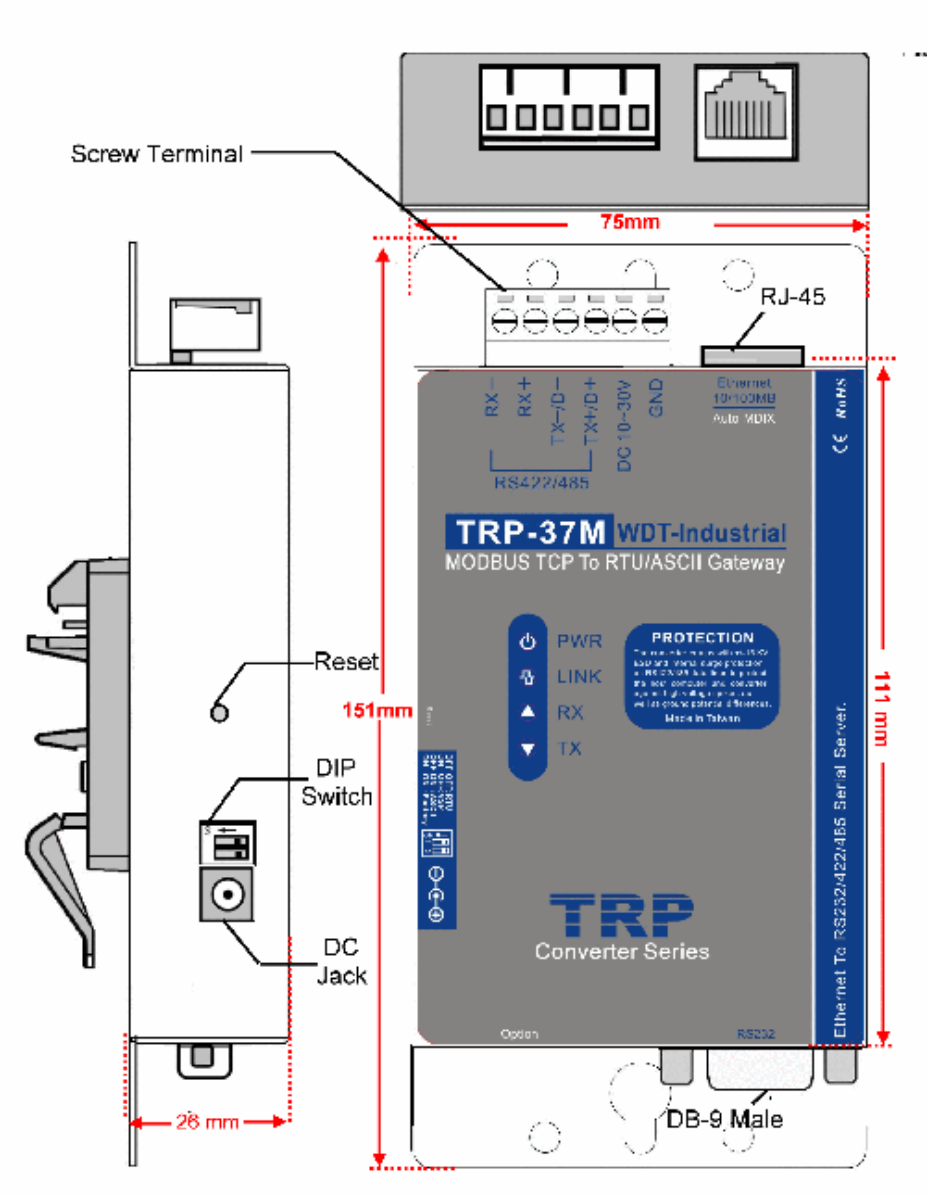
1-2 Specification

- Power Input Voltage: DC +10V to +30V.
- LAN: Auto-MDIX, 10/100 Mbps Auto-detecting.
- RS-232: TX, RX, RTS, CTS, DTR, DSR, DCD, GND.
- RS485 signal: differential 2 half-duplex wires (DATA+, DATA-).
- RS422 signal: differential 4 full-duplex wires.(TX+,RX+,TX-,RX-)
- Baud Rate: 1200,2400,4800,9600,19200,38400,57600,115200,921600 K bps.
- Parity: none, even, odd.
- Data Bits: 5, 6, 7 or 8.
- Stop Bits: 1, 1.5 or 2.
- Protocol: TCP, IP, ARP, DHCP, Telnet, HTTP, UDP, ICMP
- External switch:
  OFF OFF : Directly IP mode, RTU protocol. .
  ON OFF: Virtual-Com and Paired mode .
  OFF ON: Directly IP mode, ASCII protocol
  ON ON: Back to Factory.
- Virtual-Com mode support RS232 TXD,RXD,GND.
  RS422 TX+,TX-,RX+,RX-.
  RS485 D+,D-.
- Power supply: Screw terminal, or DC jack.
- Serial interface: +/-15 KV ESD.
- RS422/485 interface: Surge, over current, over voltage protection.
- RS422/485 interface: Industrial plug-in screw terminal.
- Plug-in screw terminal wiring: Accepts AWG #12 ~30 wires.
- Power consumption: 12V/140mA.
- Operating Temperature: -10 to 65 °C.
- Humidity: 0~90% Non-Condensing.
- Dimensions: 151(L)*75(W)*26(H) mm.
- Weight: 395g with packing.

2. Hardware Description

The following information is provided to give the user an understanding of how to connect the TRP-C37M to the LAN and serial device. A review of the switch settings and the functionality of the LED’s are also provided.

2-1. Panel layout



Notice: User can only select either external DC-Jack or Screw terminal DC input. Do not use external DC-Jack and screw terminal DC input simultaneously.

2-2. LED indicator

PWR LED: System is ready.(Blinking)

LINK LED: Ethernet cable connection and data active.

TX/RX LED: UART Transiting/Receiving Indicator.

DC Jack: Power Input DC +10V to +30V. (Pleas use the 5.5*2.1mm Dc Jack plug).

2-3. Reset Button

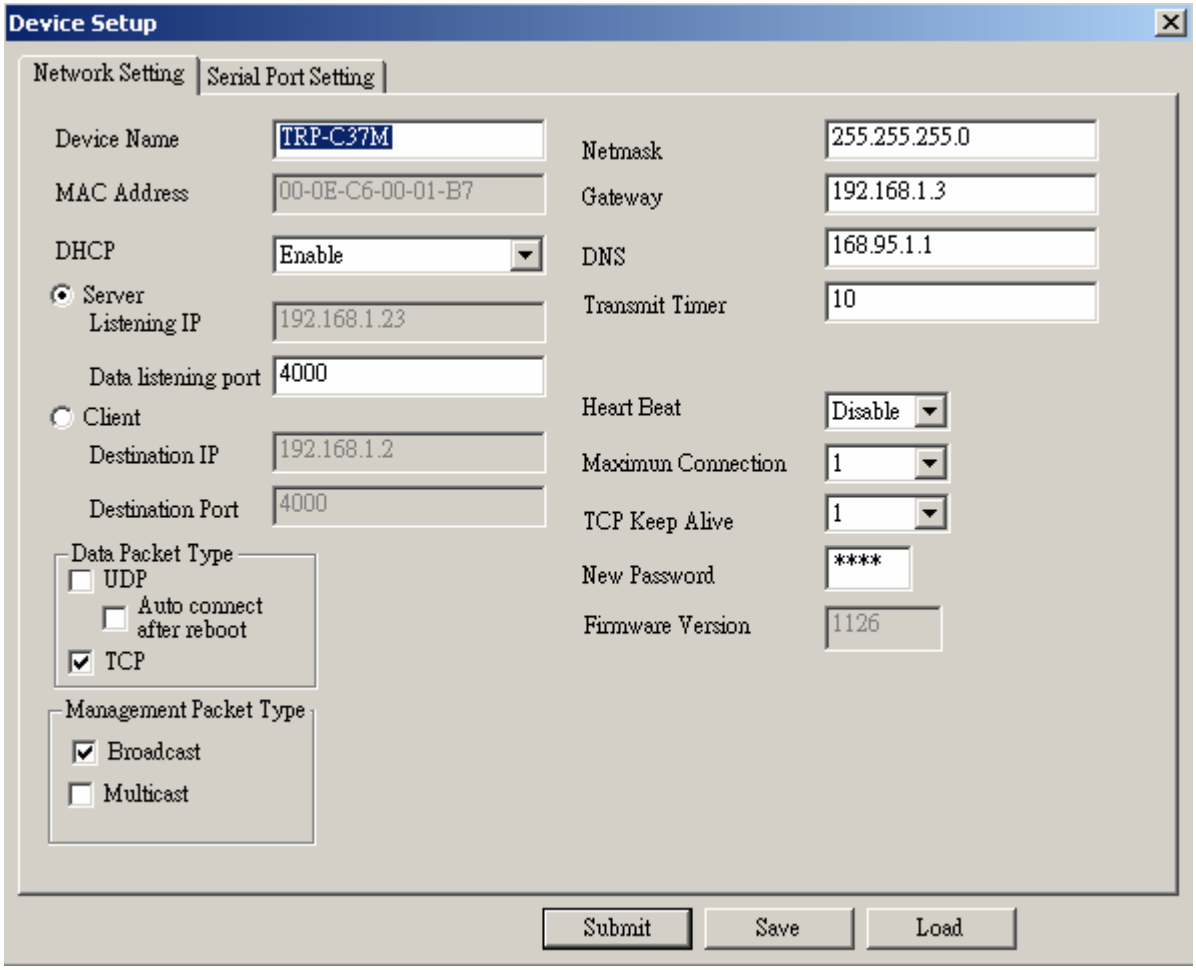
Push the reset button will Re-Boot.

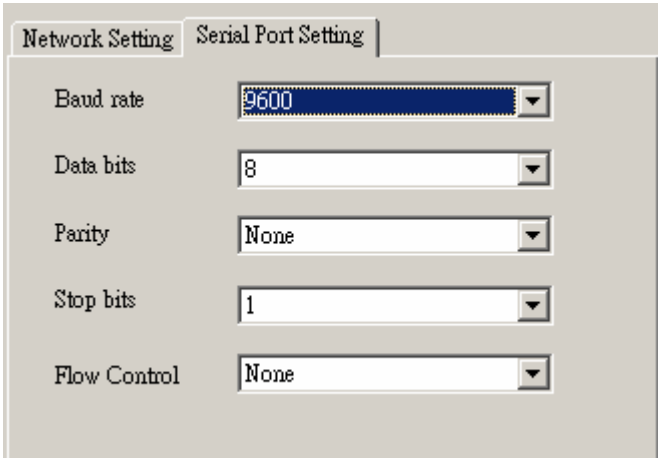
2-4. DIP Switches

External switch 1,2:	OFF	OFF : Directly IP mode, RTU protocol. .
	ON	OFF: Virtual-Com and Paired mode .
	OFF	ON: Directly IP mode, ASCII protocol
	ON	ON: Back to Factory.

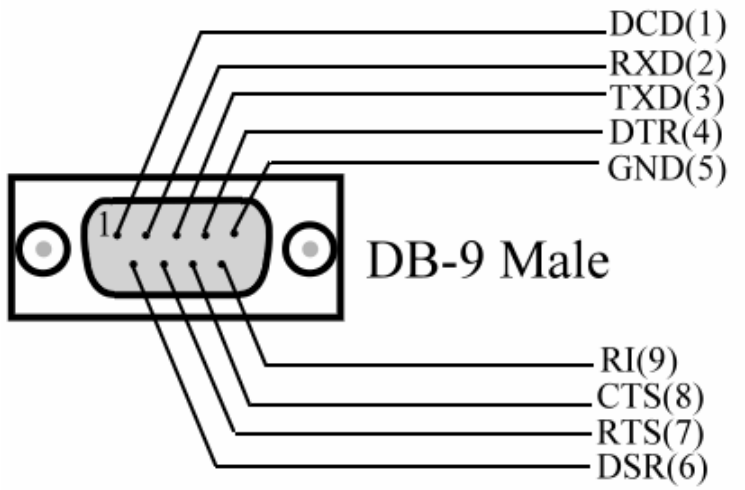
2-5.Factory Setting

Factory Setting: ***Adjust the external switch to ON ON will back to factory.**





2-6. DB-9 Pin male pin assignment



3. Install TRP-C37M Hardware

STEP1: Connect power source with TRP-C37M ,the PWR LED will blinking.

STEP2: Connect TRP-C37M with internet port by RJ45 LAN cable.

If the cable is properly connected the “LINK” LED will light up.

**The TRP-C37M Support Auto-MDIX, A straight-through or crossover Ethernet cable can be used to make a connection directly to the HUB/Router/PC.*

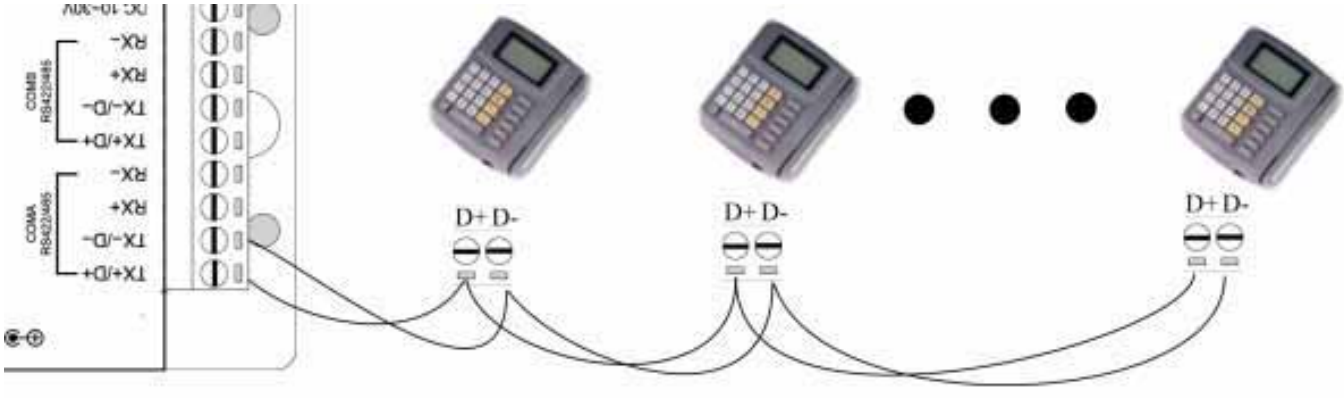
STEP3: Connect TRP-C37M with RS232 or RS422/485 RTU/ASCII of serial device.

The TRP-C37M has one DB-9 male connectors for RS232 connection and a screw terminal connector for RS422/485 connection.

The DB-9 serial port is DTE interface. A null modem cable is required to make a connection between the COM port on a PC and the TRP-C37M serial port. A straight through cable is required to connect the TRP-C37M serial port to a DCE device. The screw terminal connector accepts AWG #12 ~30 wires.

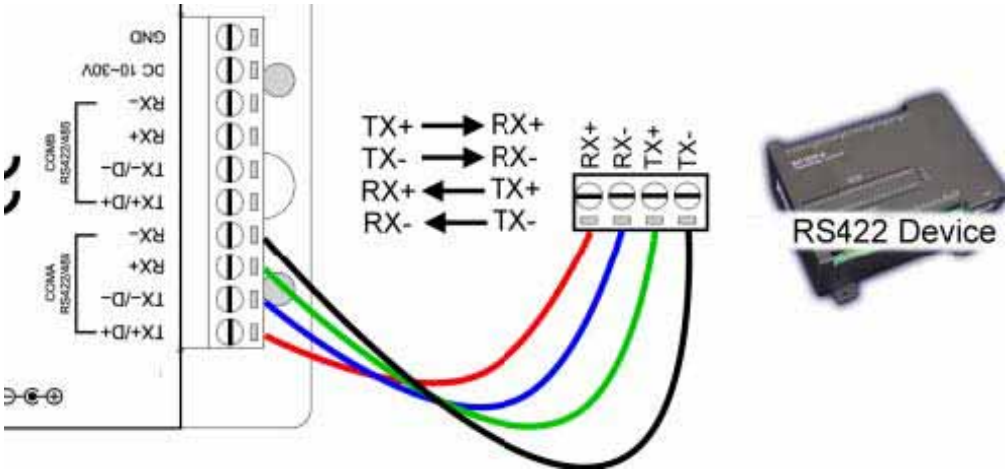
3-1. RS485 Wiring

The RS-485 mode supports the Transmit and Receive channels using 2-wire half-duplex operation.



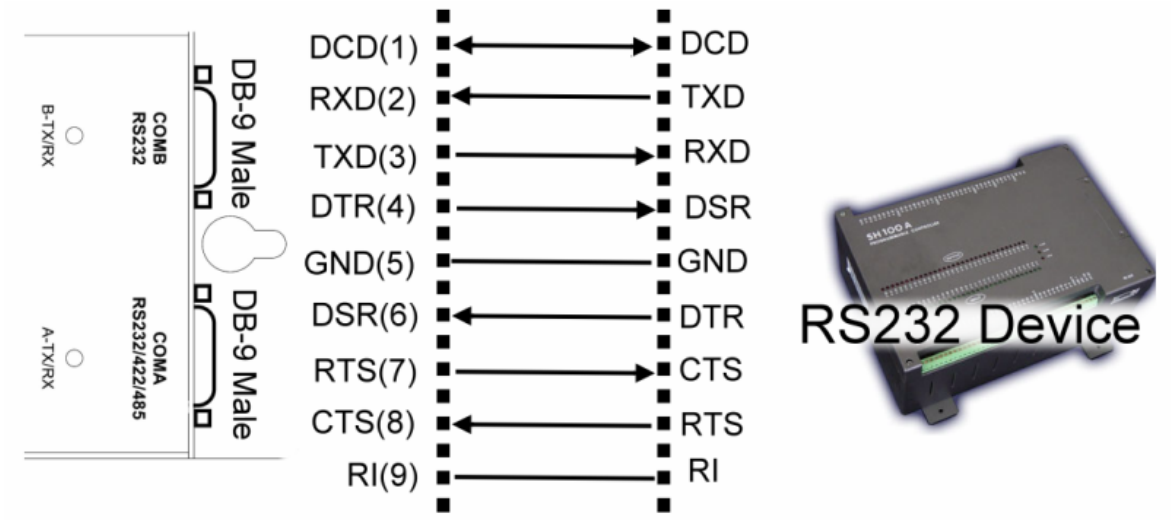
3-2. RS422 Wiring

The RS-422 mode supports 4 channels with full duplex operation.



3-3. RS232 Wiring

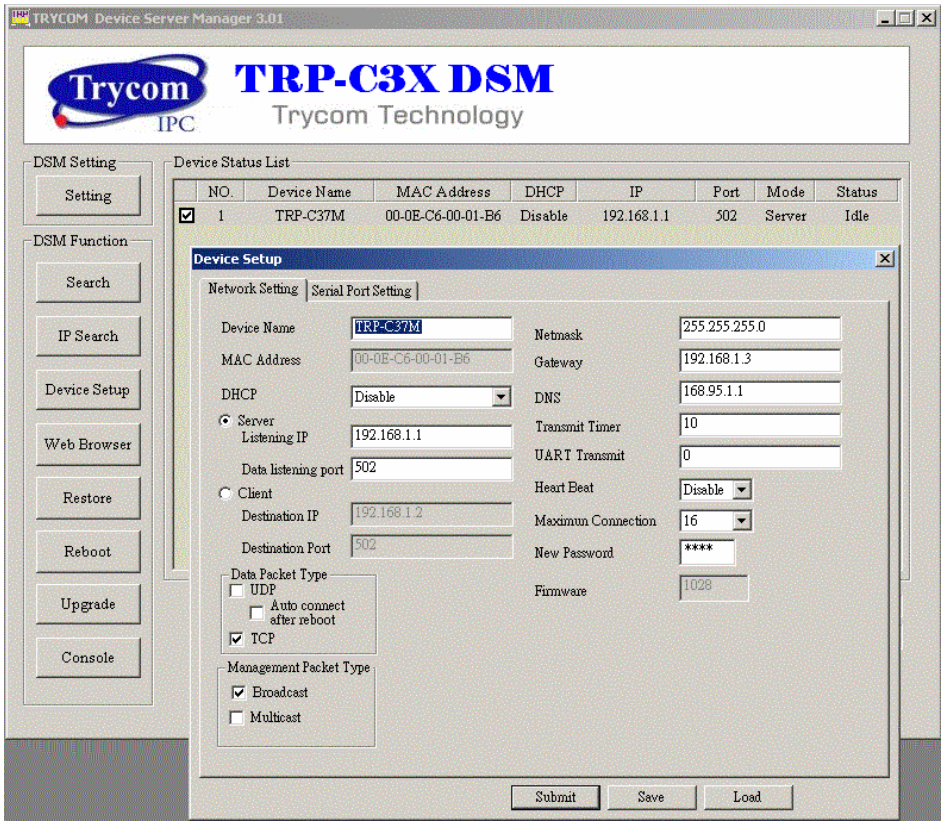
The RS-232 supports 8 channels plus Signal Ground and is configured as DTE like a computer. Signals are single ended and referenced to Ground. To use handshaking, Flow Control must be set to RTS/CTS during Configuration. Refer to the Pin out table for connections.



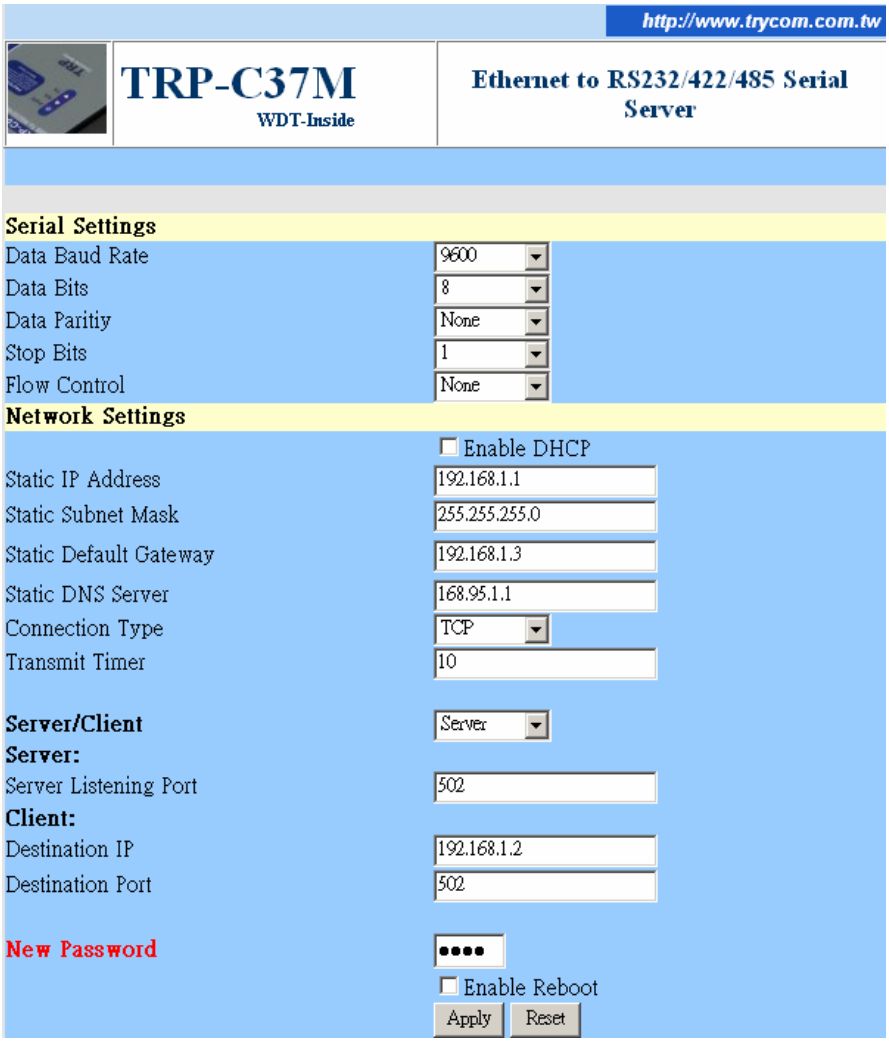
4. How to configure TRP-C37M

There are 3 ways to access the Server Properties and program the TRP-C37M.

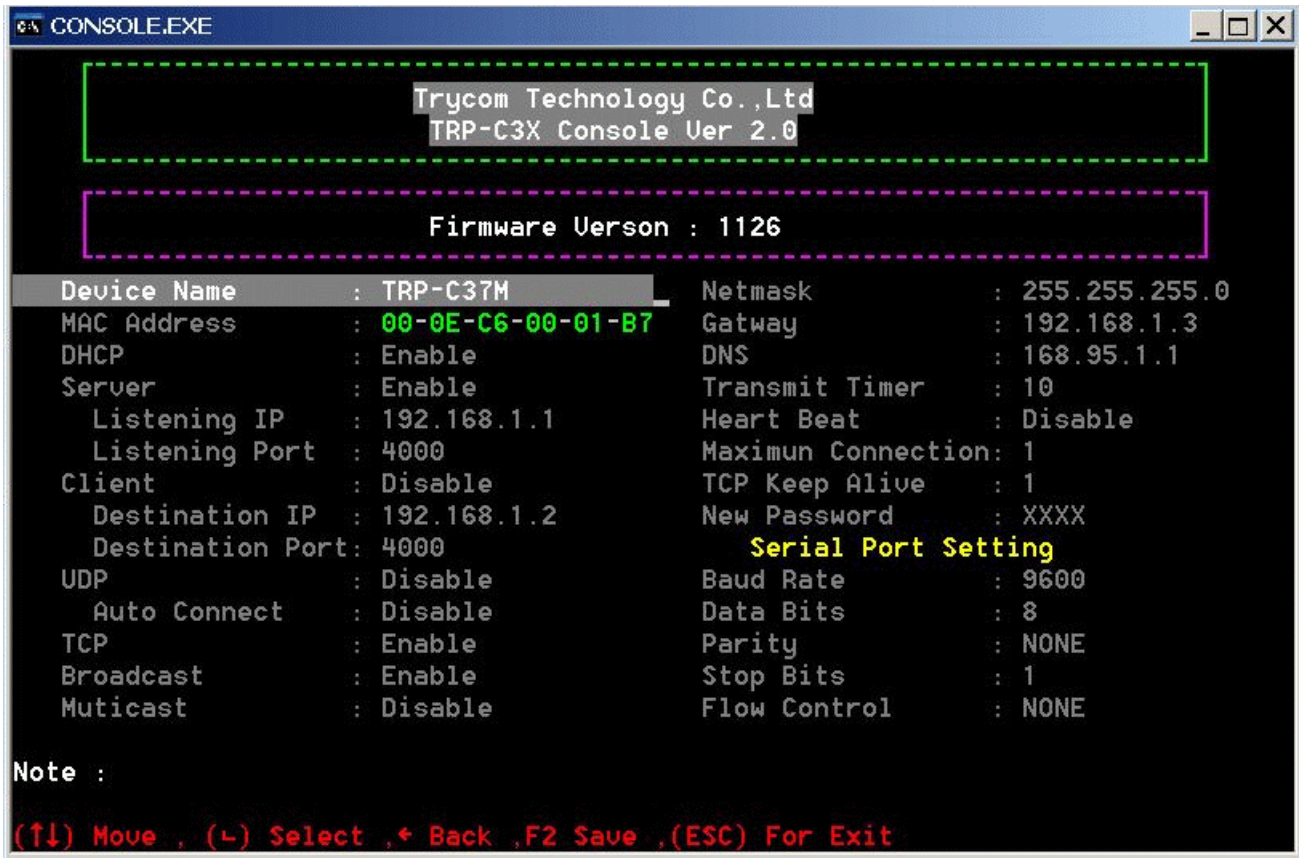
a.TRP-C3X DSM utility.



b. WEB Server



c. Serial Console



4-1. Using TRP-C3X DSM Utility.

The **"TRP-C3X DSM"** software performs several functions:

A: Searching for TRP-C37M connected to the network.

B: Displaying and changing the configuration of TRP-C37M.

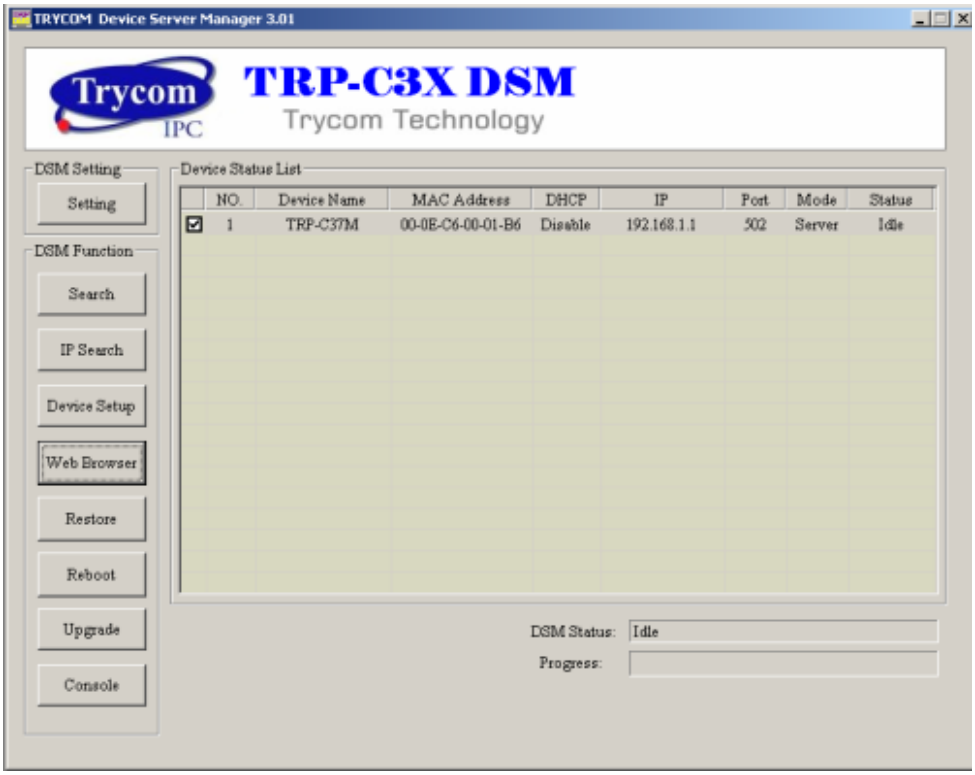
C: Upgrading the TRP-C37M firmware.

*Refer the Firmware upgrade help file.

D: Saving and Loading Configuration from external log File or EEPROM.

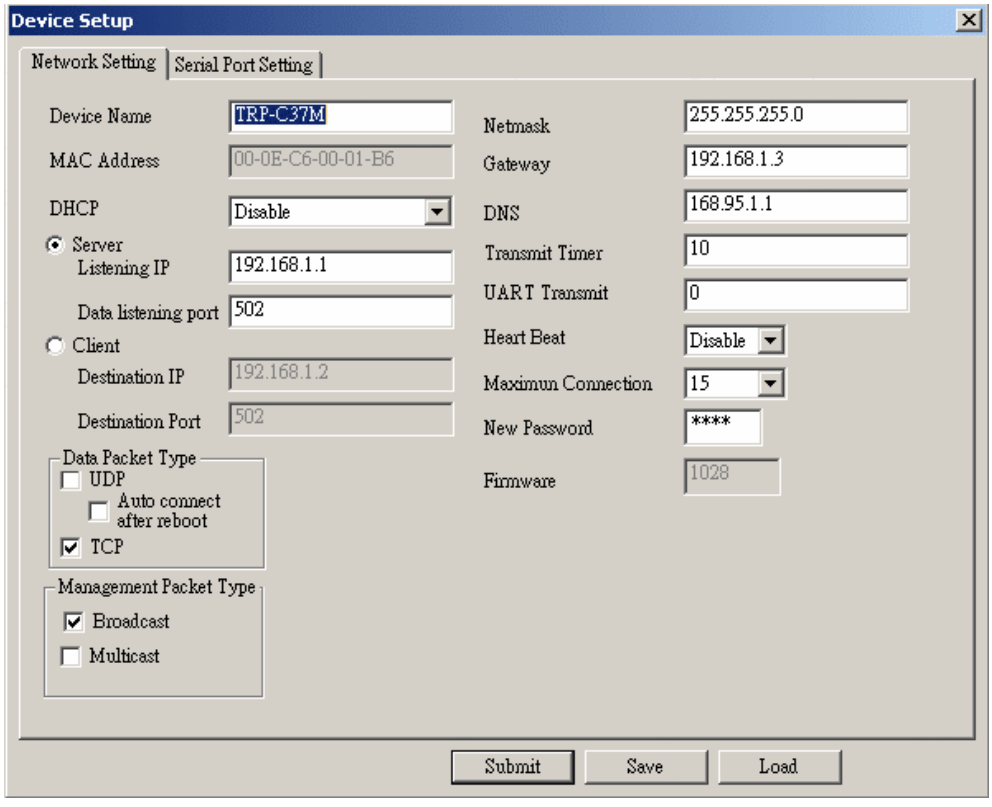
4-2. Searching LAN for TRP-C37M

Once TRP-C37M is connected to the LAN the **TRP-C3X DSM** software will search it and display it in a window by name , IP address, Mac….Information.



4-3.Configuring Server Properties

Select the “NO.” item and Double click to open the Server configuration, after setting then click “Submit” will save the configuration to EEPROM.



Device Name

Device server name, Maximum 10 chars.

MAC Address

The Device server MAC address.

DHCP

If DHCP is disabled, it allows user setting the IP address, Subnet mask, Gateway.

If DHCP is enabled ,the IP address, Subnet mask, Gateway address will be dynamically configuration by DHCP server such router.

When “DHCP” is enabled ,but the DHCP server is not available on the network, the TRP-C37M will timeout then back to factory setting IP=192.168.1.1.

Server Listening IP

The Gateway IP address.

Server Data listening port

RS232/422/485 port address.

Client Destination IP

When user using the paired mode, the client setting need to input Server IP and Port which one need to connect.

Client Destination port

UART Serial I/O address.

Port**:** 16 bit number. (1 ~ 65535)

Netmask

The default LAN Netmask is configured for a Class C address. This maybe reconfigured by the user.

Gateway

Input the gateway IP address that can be allows users to access the serial gatway from internet.

DNS

Short for Domain Name System, an Internet service that translates domain names into IP addresses. Because domain names are alphabetic, they're easier to remember. The Internet however, is really based on IP addresses. Every time you use a domain name, therefore, a DNS service must translate the name into the corresponding IP address.

Transmit timer:0~64 mS/Unit

Time interval to send out serial data char staring packet.

UART Transmit:0~15 uS/Unit

Time interval to send out serial data char packet.

Hear Beat: Disable /Enable

When Hear Beat enable, it allows open a 5300 port, 5 sec interval to send out data char packet that provides a easy way to ensure the LAN communications between Host PC Client and gateway devices.

Maximum Connection: 1~16

The function allows the user to configure the TRP-C37M Serial Gateway to have up to 16 TCP client connections.

TCP Keep Alive: 1~7 /Minute

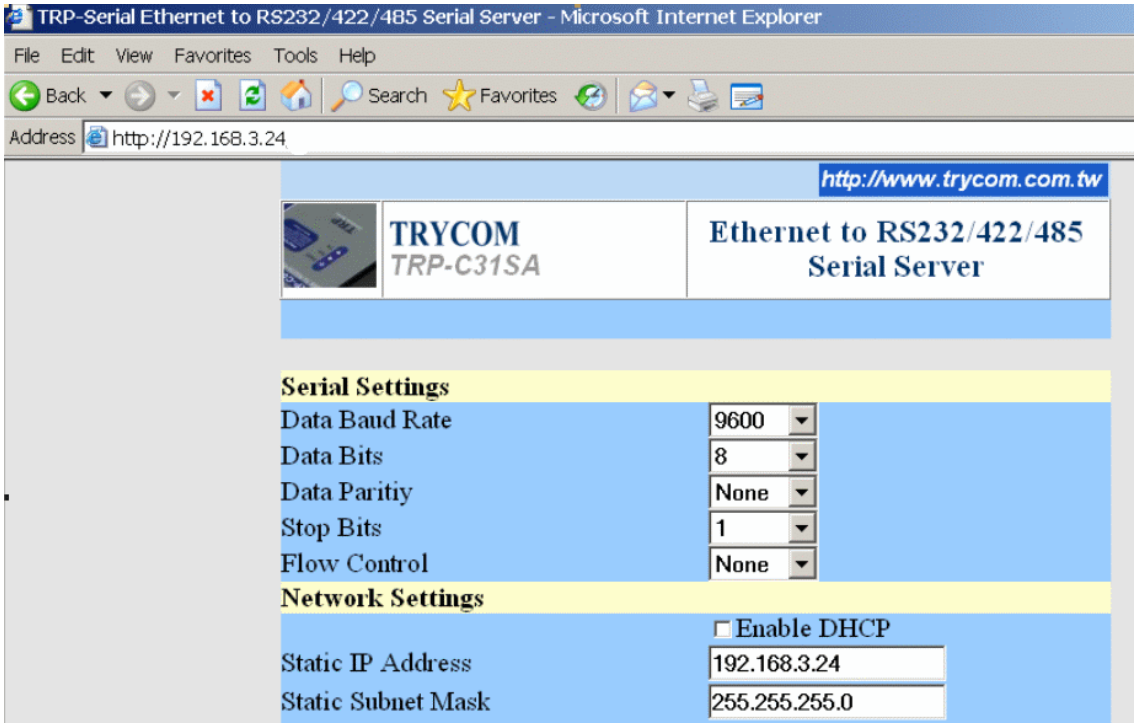
When TRP-C37M in Server mode, the TRP-C37M without data over the 1~7 Min setting value,

The TRP-C37M will be disconnect TCP.
When TRP-C37M in Client mode, the TRP-C37 without data over the 1~7 Min setting value, The TRP-C37M will be reconnecting TCP.

New Password: 1234
It only accept value from1000~9999 integer, if input the wrong password over 5 times, the WEB-Page will lock until the TRP-C37M re-boot.
Firmware Version
Firmware Version.
Serial Port setting
Baud Rate: UART Speed from 1200,2400,4800,9600,19200,38400,57600,115200,921600 k bps
Data Bit: 5,6,7,8
Parity: Odd, Even, None
Stop Bits: 1, 1.5
Flow Control: Xon/Xoff, Hardware, None
Submit
Save the setting value to EEPROM.
Save
Save the setting value to external log file.
Load
Load the setting value to external log file.
Upgrade
Upgrade the firmware
**Wrong way the upgrade firmware will cause the TRP-C37M system fail.*

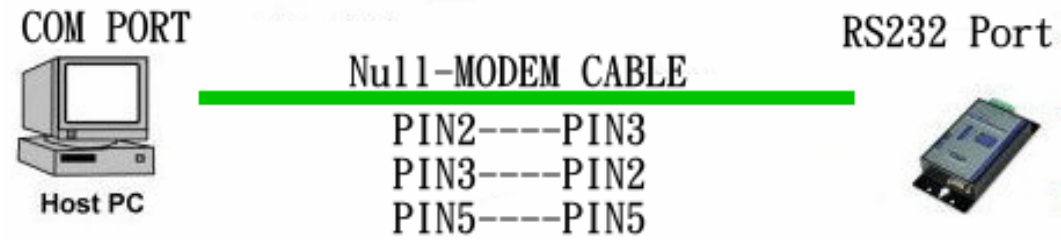
4-4 using the WEB Server mode
The Web Server can be used to configure the TRP-C37M Serial Gateway from any web browser software (such as I.E).

In Internet Explorer type the IP Address of the Serial Gateway into the address field and press the **Enter** key. The following window will appear:
Example:
If TRP-C37M IP is 192.168.3.24 Please Input the 192.168.3.24 then enters at web address, the web-page will appear….. See diagram below.

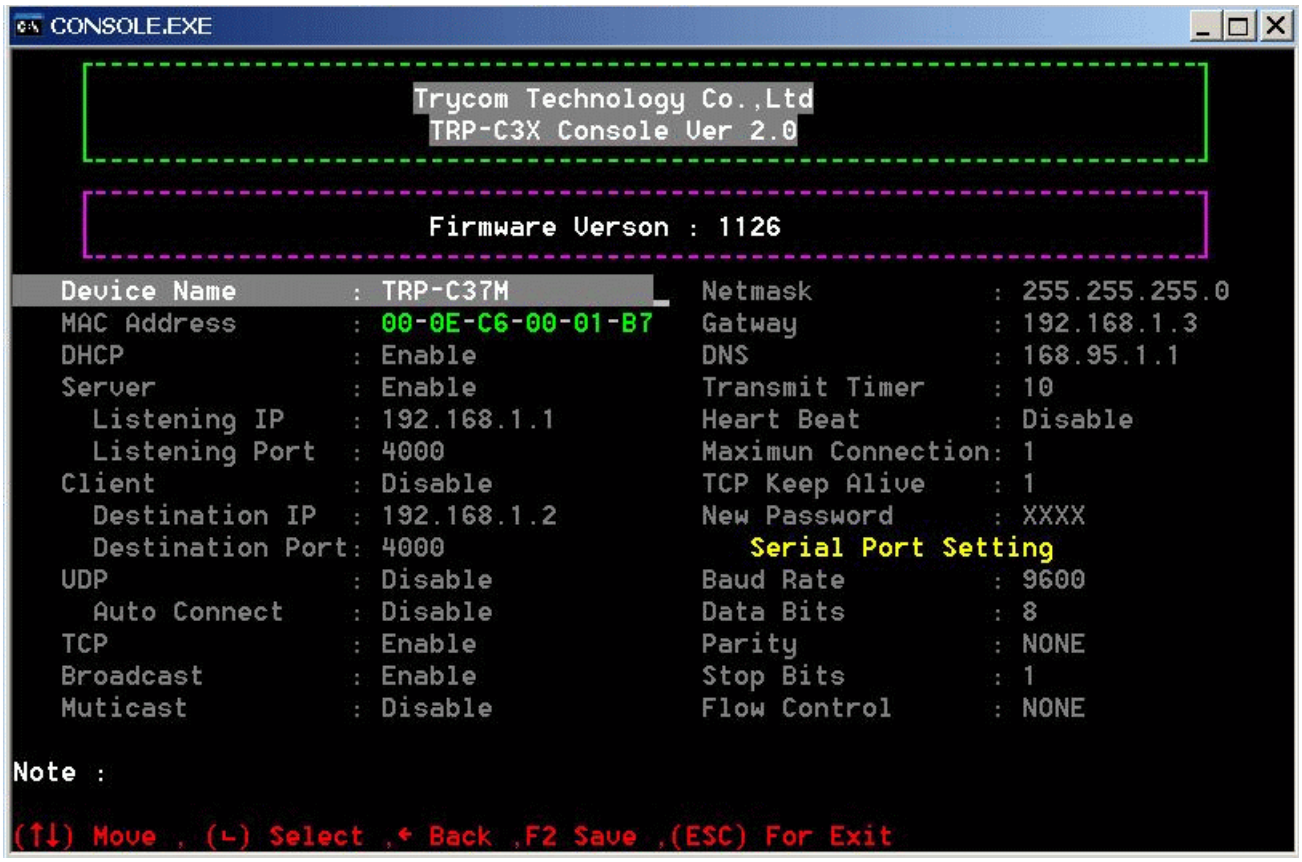


4-5 Using the serial console mode

The serial console can be used to configure the TRP-C37M Serial Server from DB-9 connector link the HOST PC by null modem cable.



Insert the TRP-Serial CD then find the CONSOLE.exe, The CONSOLE file support all windows O.S include MS-DOS, Run the CONSOLE file and **Re-boot** the TRP-C37M then select correct host COM port number and data format.

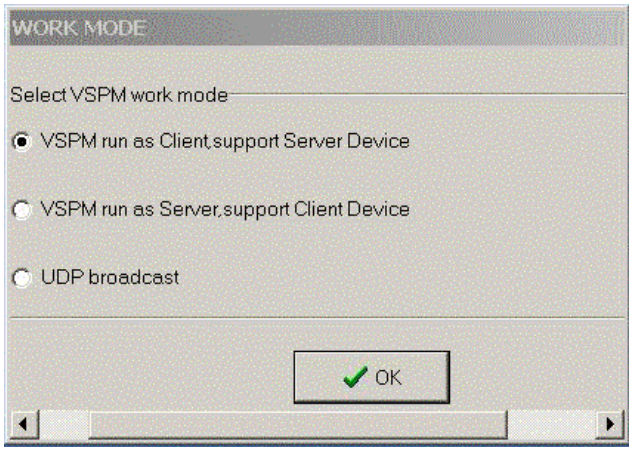


5. Install the Virtual-COM

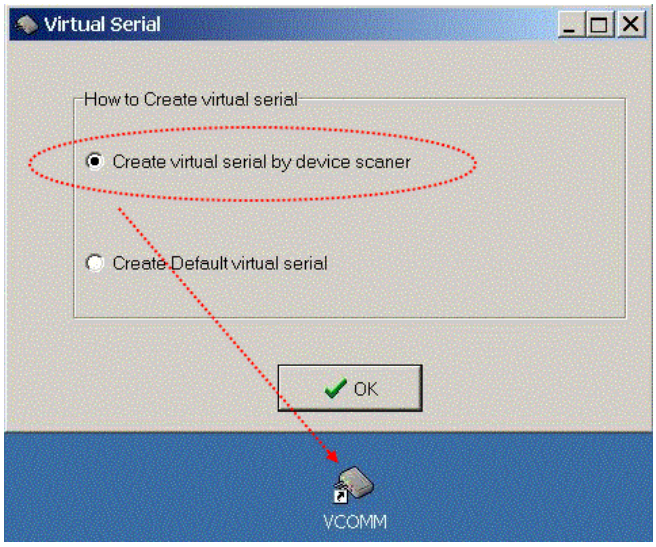
The Virtual-COM utility support TCP/IP、UDP data mapping to the HOST PC virtual-com, it can creative Maximum 512~1024 virtual-com port, Support Server、Client、UDP mode, Support all Windows O.S include Win98/Win2000/WinXP/Vista/Win2003/WIN7,Support Multi-virtual com at different PC to one Serial Gateway; Support Ethernet and Internet , If TRP-C37M off line or power fail, The Virtual-Com utility will try to Reconnection.

Step 1. Adjust the switch position to “ON, OFF”.
Step 2. Insert the TRP-Serial CD and find the TRP-C37M folder.
Step 3.Click “Vcomm.exe” icon then install Virtual-COM utility.
*The Virtual COM utility support multi-language, please select which language do you need.

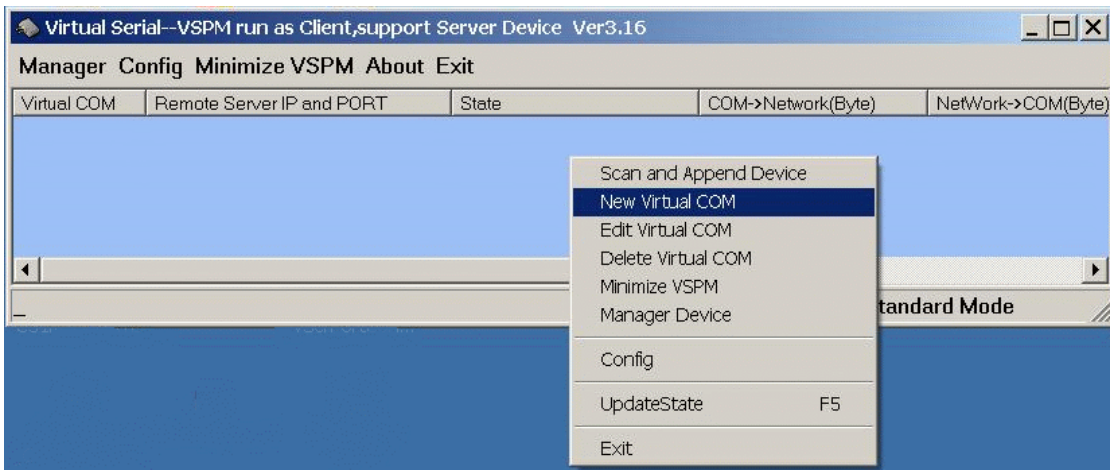
Step4. Click “OK” button and select “VSP run as Client support Server Device”.



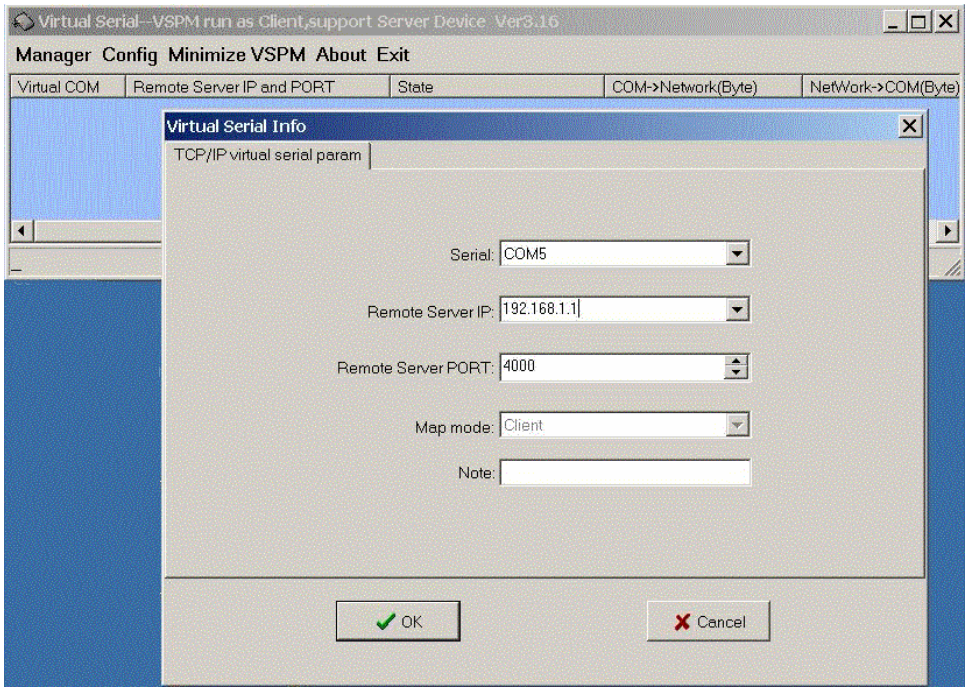
Step5. Select “Create virtual serial by device scanner”, then press “OK”



Step6. Run VCOMM.exe then click right button select “New Virtual COM”

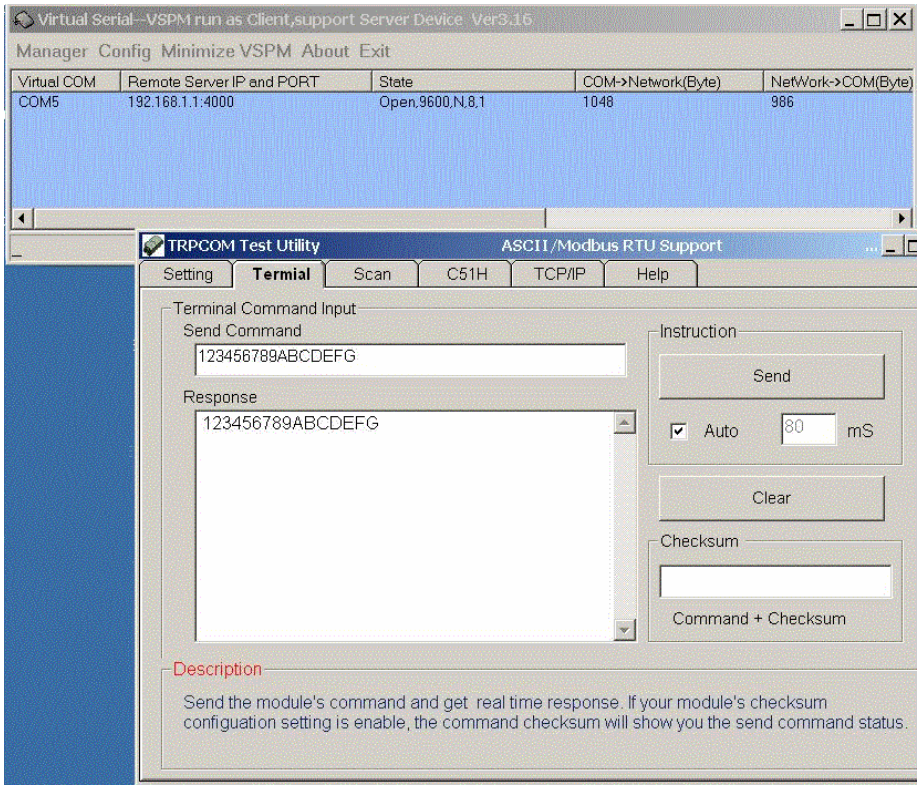


Step7. Select “Select Serial Port” and input TRP-C37M IP and port then press “OK”.

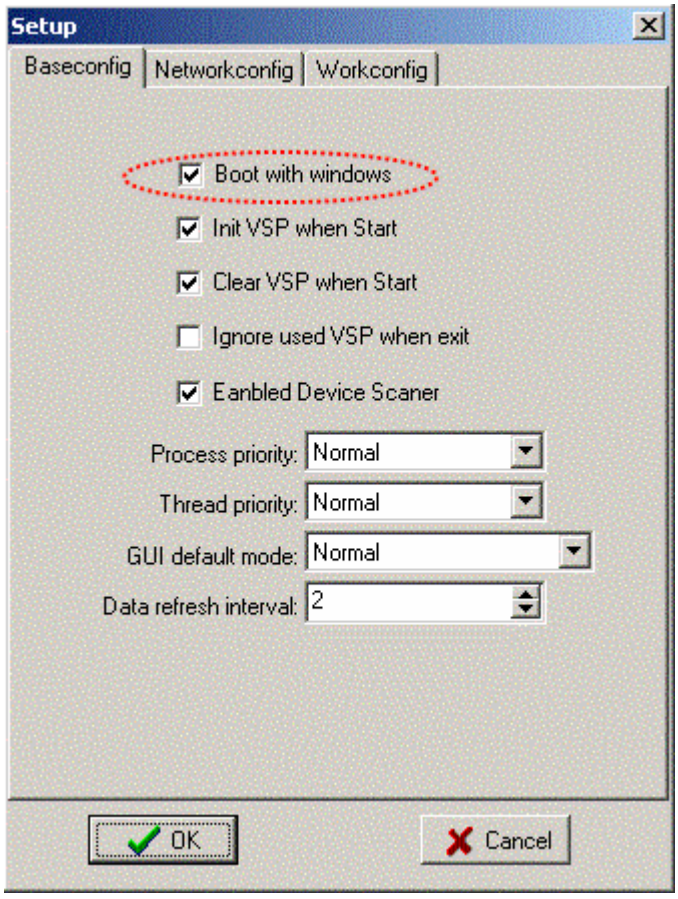


Step8. If Virtual-Com setting success, the display will appear bellow.

Step9. Run TRPCOM utility then select virtual-com port make a TRP-C37M loop test.



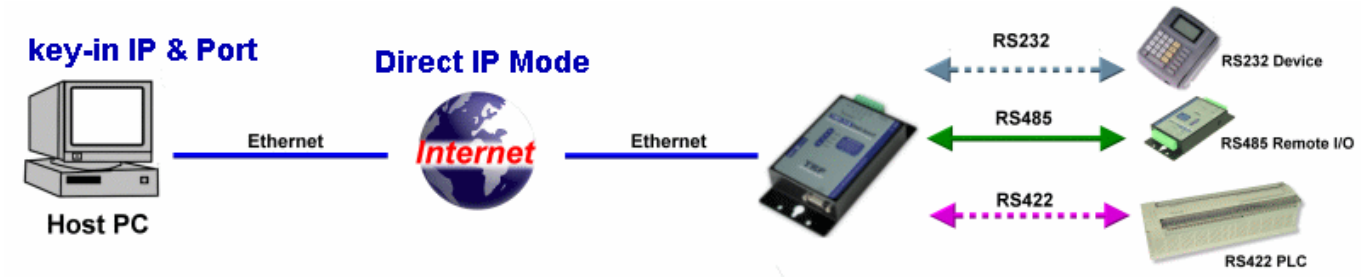
*If in VCOMM‘s configuration select “Boot with windows”, the virtual-com will Auto-connection when windows start.



6. Application

6-1 Direct IP Mode

Notice: If TRP-C37M is MODBUS RTU protocol, Please turn the switch 1,2 to OFF,OFF.
OR if TRP-C37M device is MODBUS ASCII, Please turn the switch1,2 to OFF,ON.

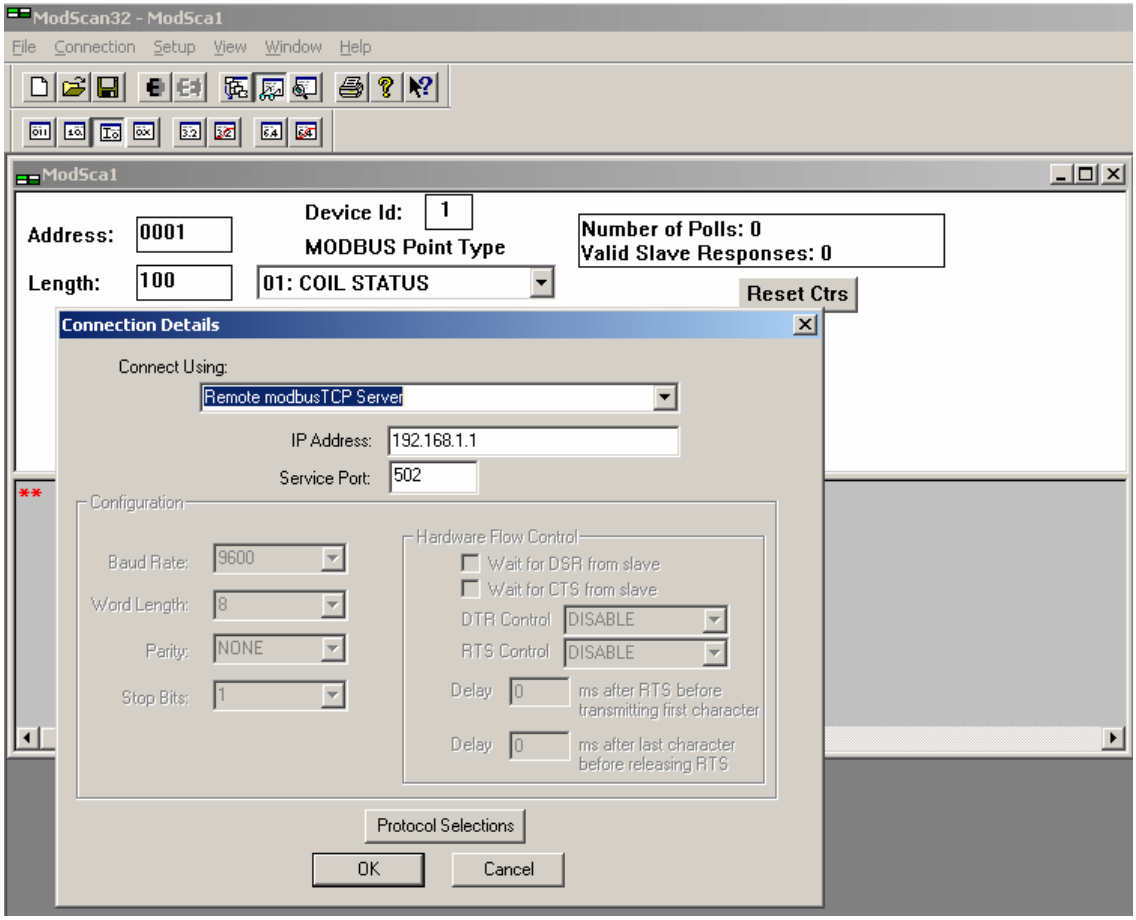


Example:

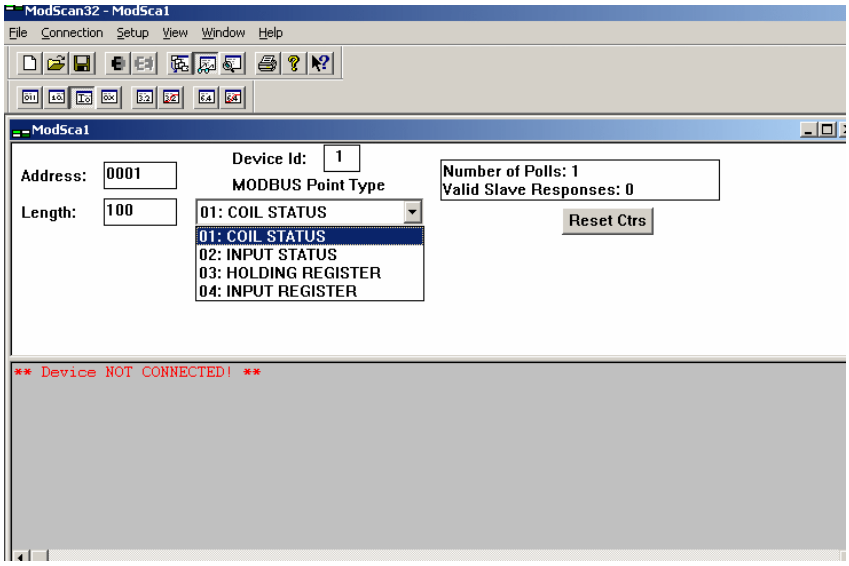
Step1: Connect PC-----Ethernet-----TRP-C37M-----RS232/422/485---MODBUS RTU/ASCII device.

Step2.Run Modscan32 utility and input IP/Port, click “OK” button, then Select function code , The response will appear below.

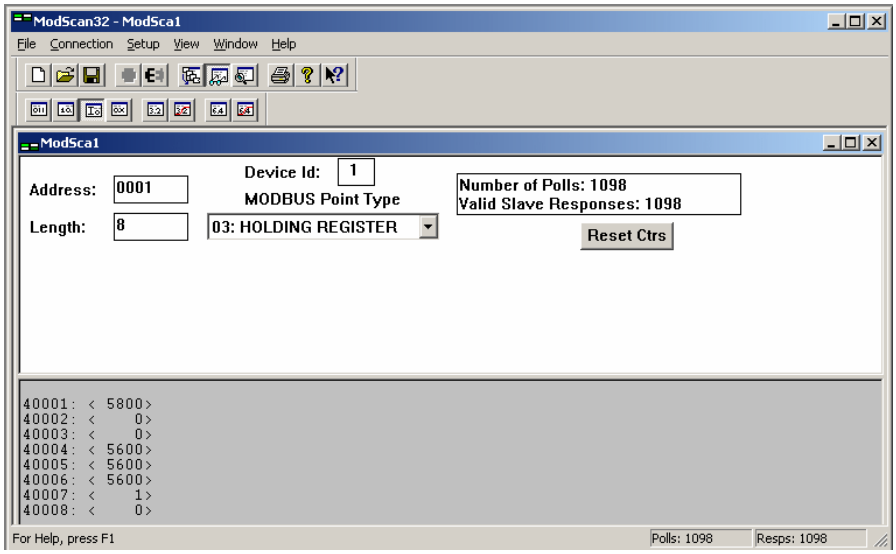
The Modscan32 utility copyright belong the Win-TECH Software Design, user can find it from the www.win-tech.com.



Step3.Select function code.



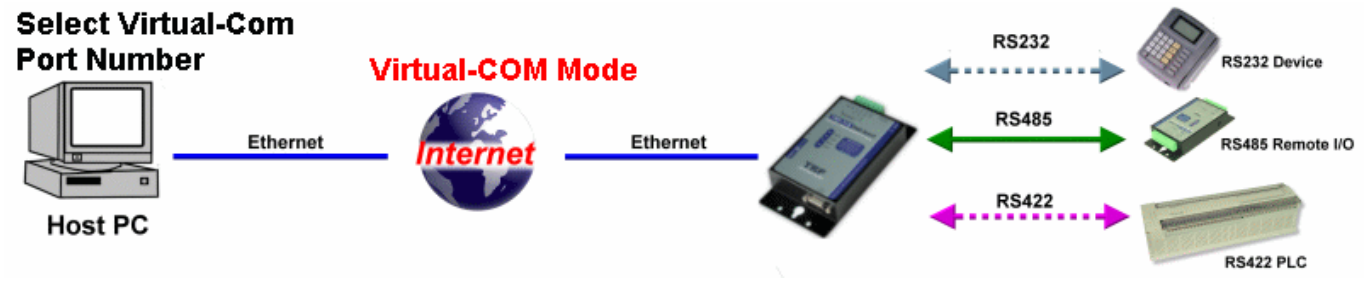
Step4.the modscan32 will be response below.



6-2 Virtual COM Mode

*Notice: Please turn the switch 1,2 to ON,OFF for Virtual-COM Mode.

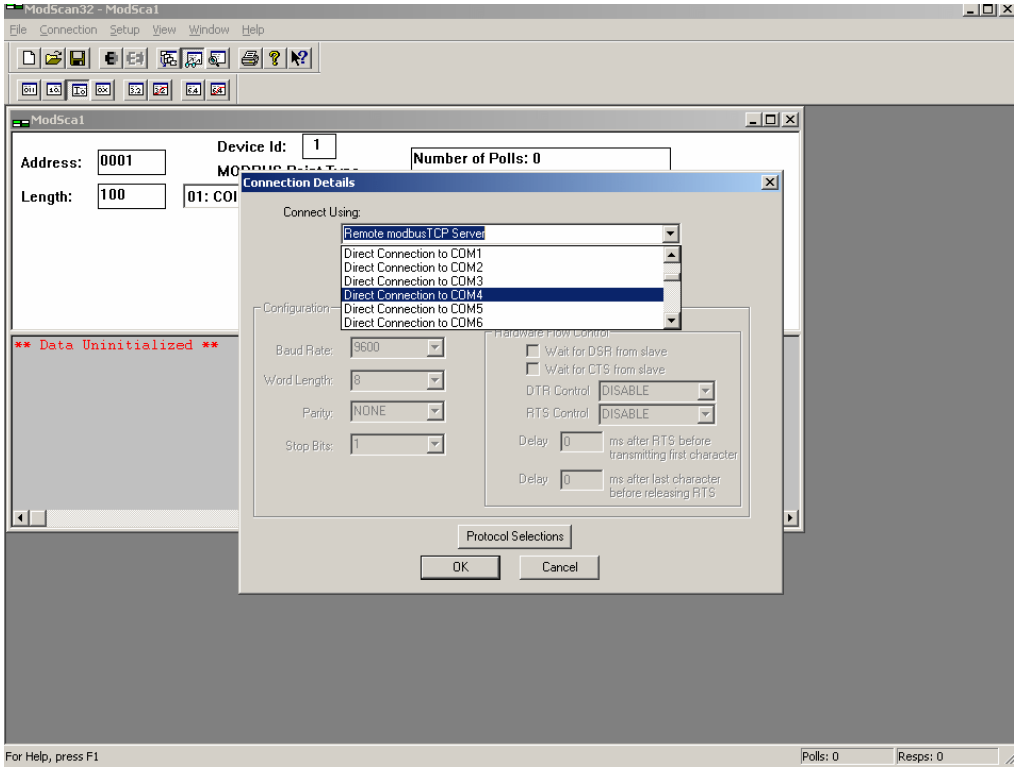
*Support ASCII and binary code include MODBUS RTU/ASCII protocol in Virtual-com Mode.



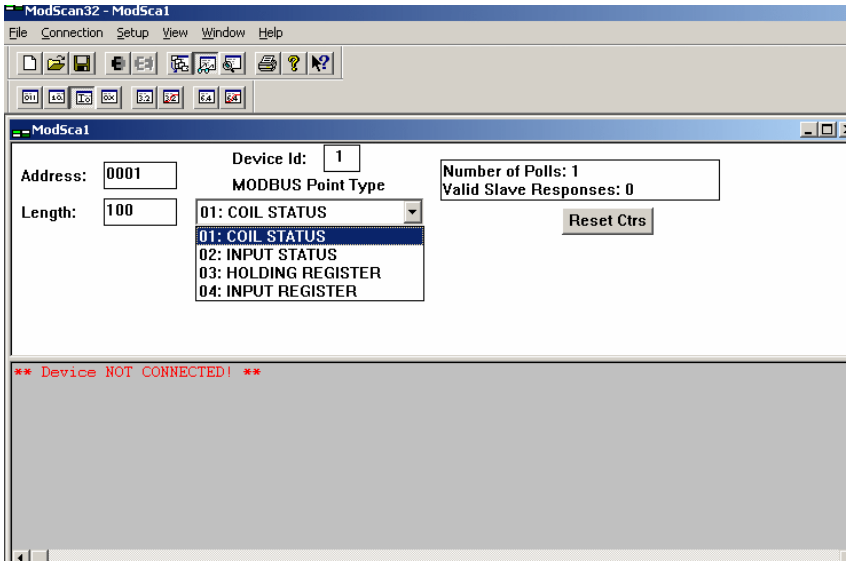
Example:

Step1. Connect PC-----Ethernet------TRP-C37M-----RS232/422/485---MODBUS RTU/ASCII device.

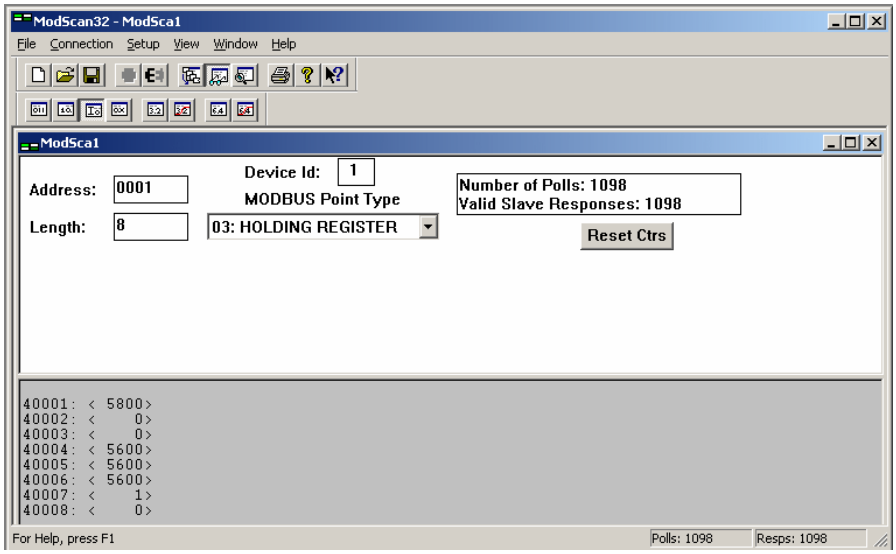
Step2. Run Virtual-COM utility and make a virtual-COM port, Run modscan32 utility and input com port number, press “OK”.



Step3.Select function code which you need.

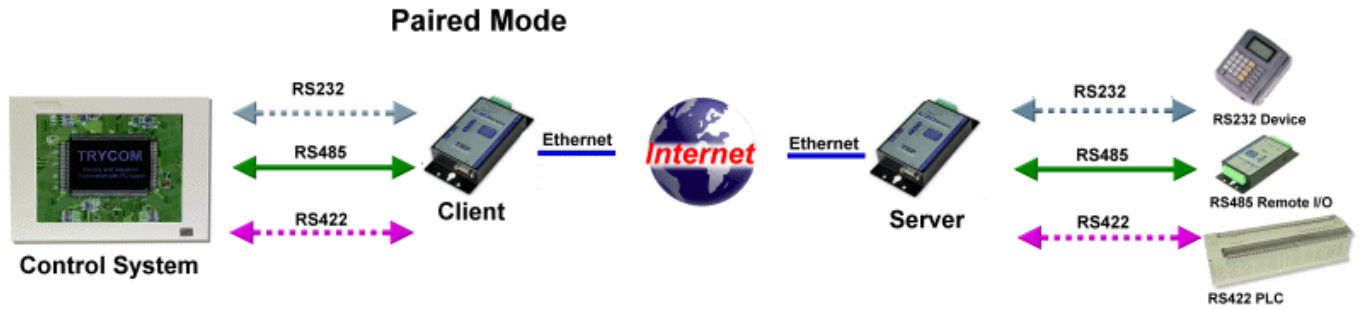


Step4.the modscan32 will be response below.



6-3 Paired Mode

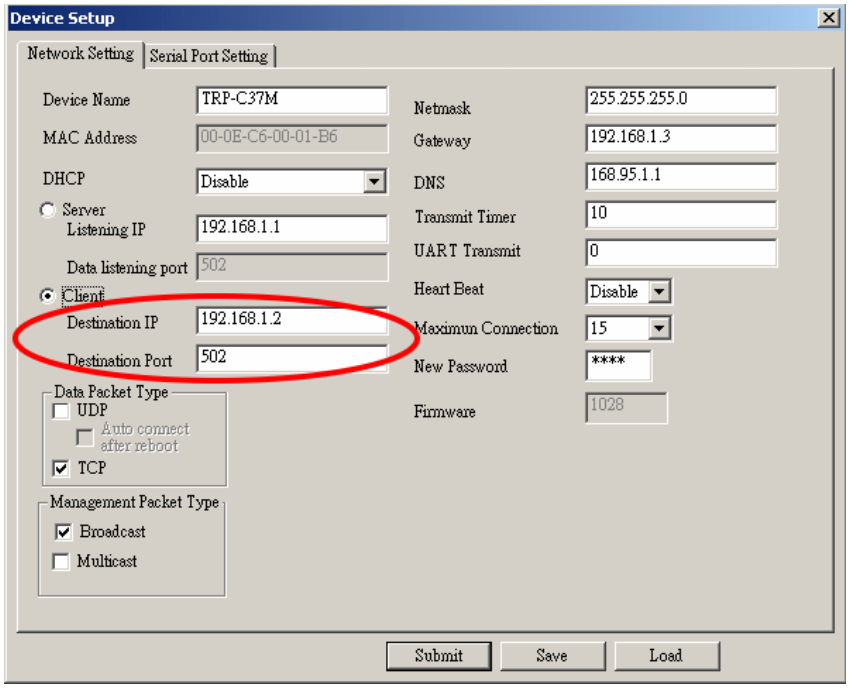
*Notice: Please turn the switch 1,2 to ON,OFF for Paired Mode.



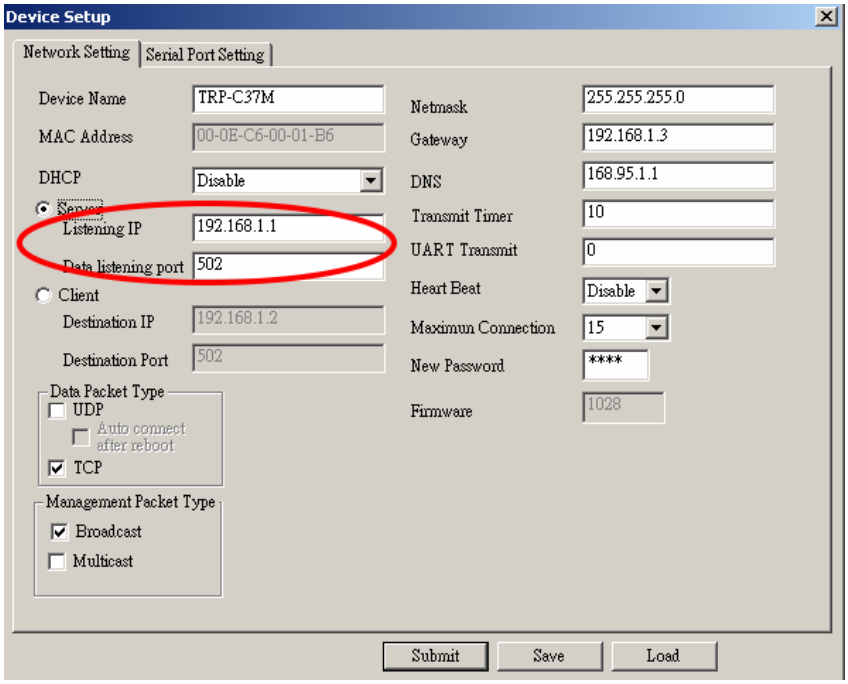
Example:

Step1. Connect PC---RS232/422/485---TRP-C37M-----Ethernet------TRP-C37M----MODBUS RTU/ASCII slave device.

Step2.Run DSM set up ***TRP-C37M Client***, Input destination IP and Port.

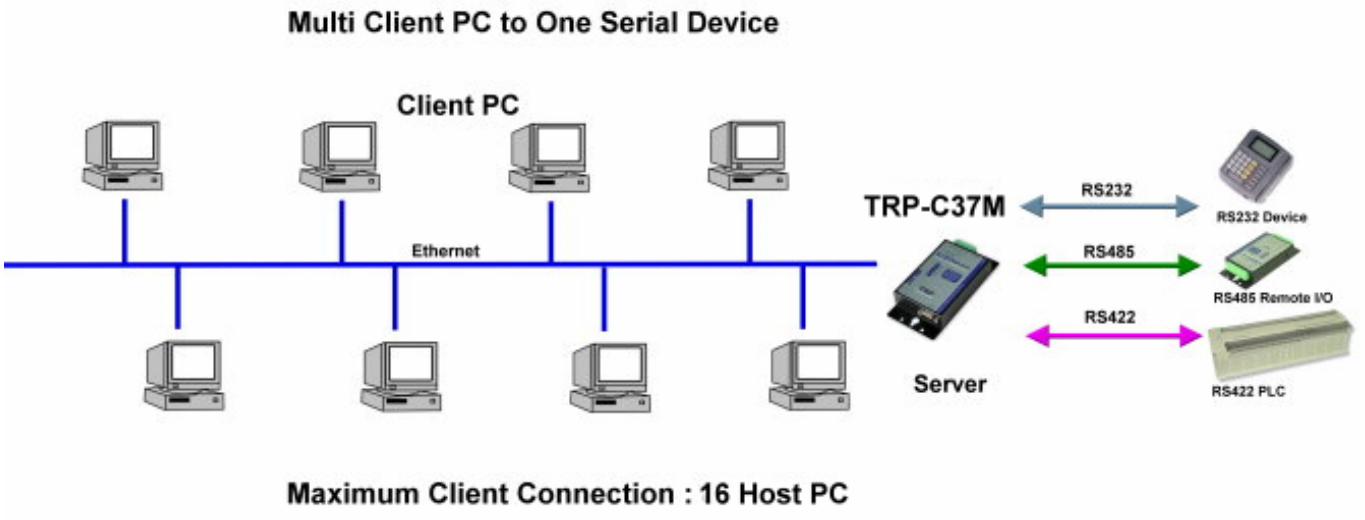


Step3.Run DSM set up ***TRP-C37M Server*** and be sure the IP and port as same as client setting.



Same step3 and step4 same refer above.

6-4 Multi-Client to 1 TRP-C37M Server



Example:

Running at Multi-Direct IP Mode

Step1.Connect Multi-PC ---Ethernet----TRP-C37M Server----TRP-C28 (RS485 ID=1)

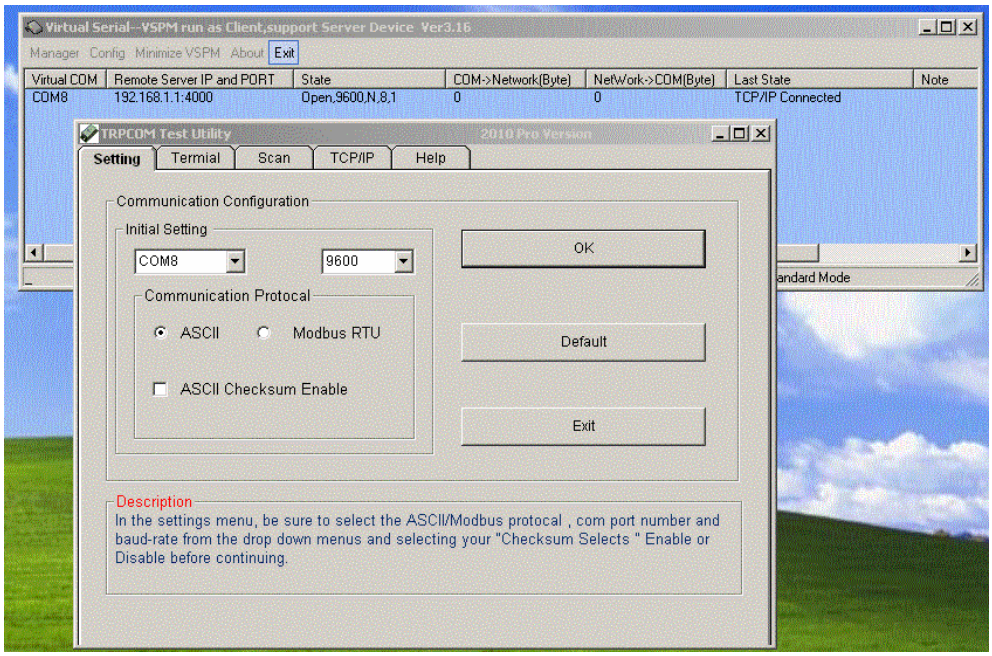
Step2.Run DSM Set up ***TRP-C37M*** Maximum connection=16.

Step3.All host PC run Modscan32 .

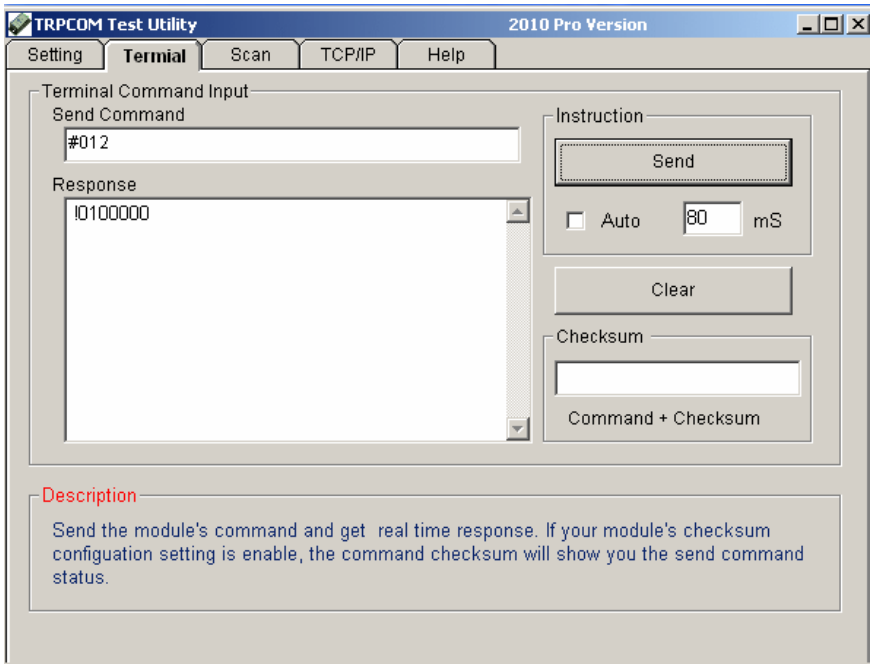
.

Running in Multi-Virtual COM Mode

Step1. All PC run Virtual com utility and make a self virtual-COM port, Run TRPCOM utility and select com port number, and press “OK”.



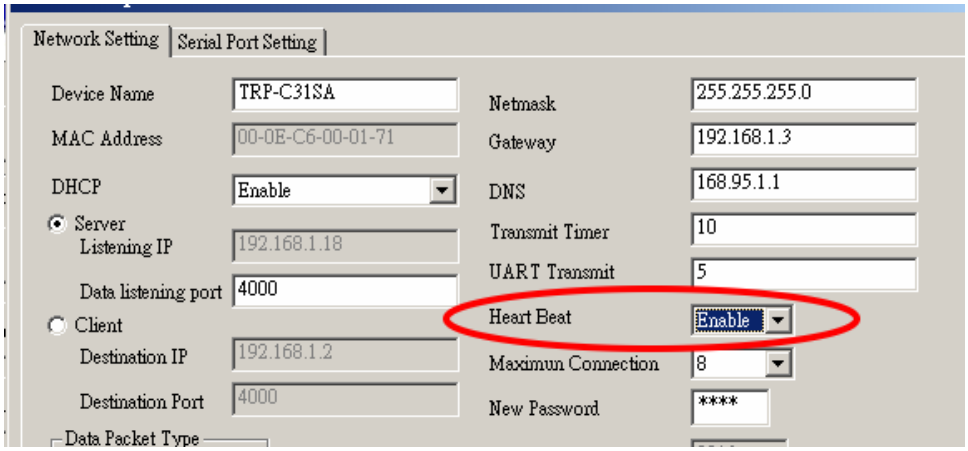
Step3.Select “Terminal” and send command, the response will appear TRP-C28 channel 2 counter value.



6-5 Heart Beat

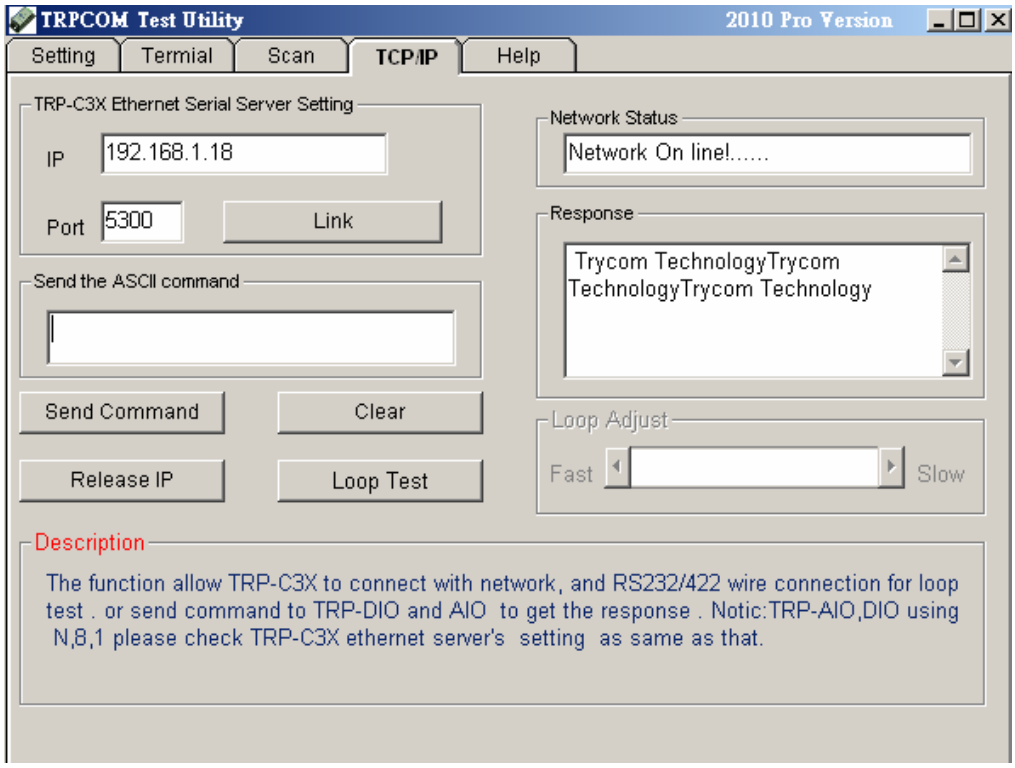
The heart Beat function help customer detection the TRP-C37M LAN on–line or off-line, User can open one 5300 port, if TRP-C37M on line, the 5300 port will send a char staring period of 5 sec.

Step1: Run TRP-C3X DSM utility to set up the heart beat enable.

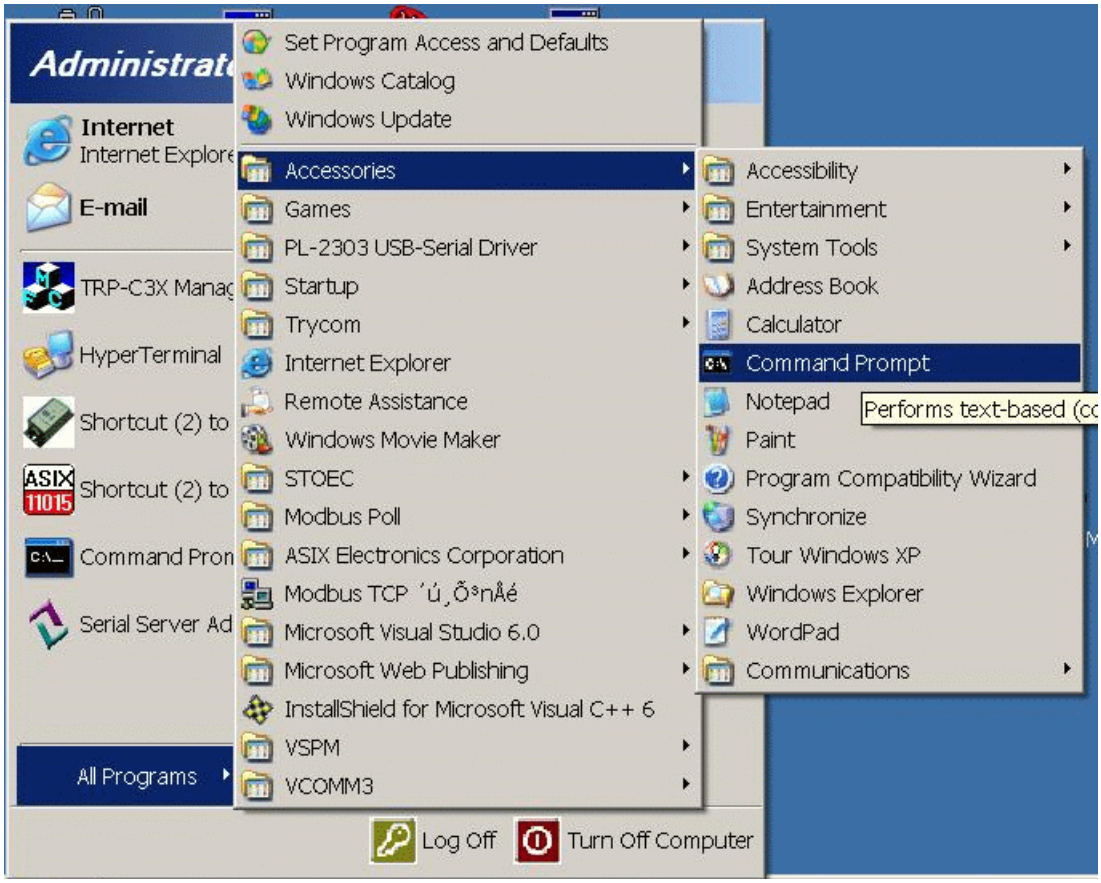


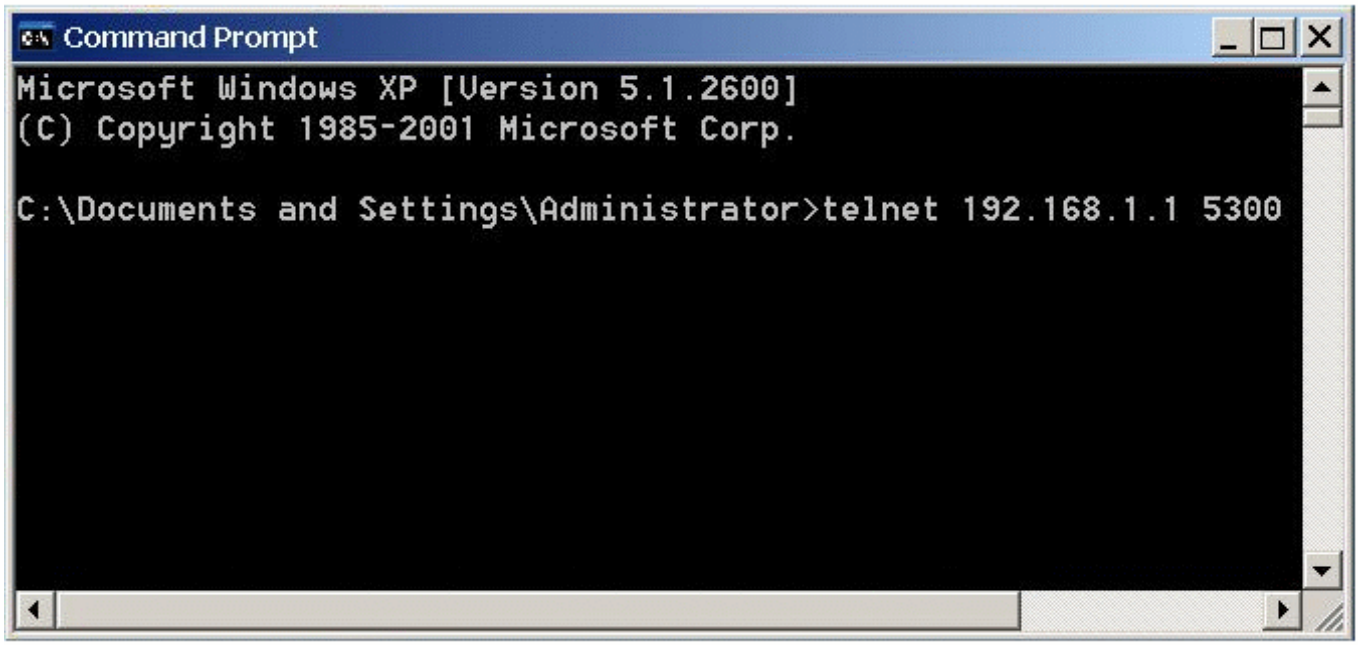
Step2: RUN TRPCOM then click “Link” button

Wait until the Response screen appear the message



Step3: Click windows start then select Accessories then click “Command Prompt”, type dos command telnet 192.168.1.1 5300




Command Prompt
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.
C:\Documents and Settings\Administrator>telnet 192.168.1.1 5300

Wait until the Response screen appear the char message

7. Using TRPCOM Utility test TRP-C37M.

We recommend use the virtual-com mode test all RS232/422/485 function.

Please turn the switch 1,2 to ON,OFF

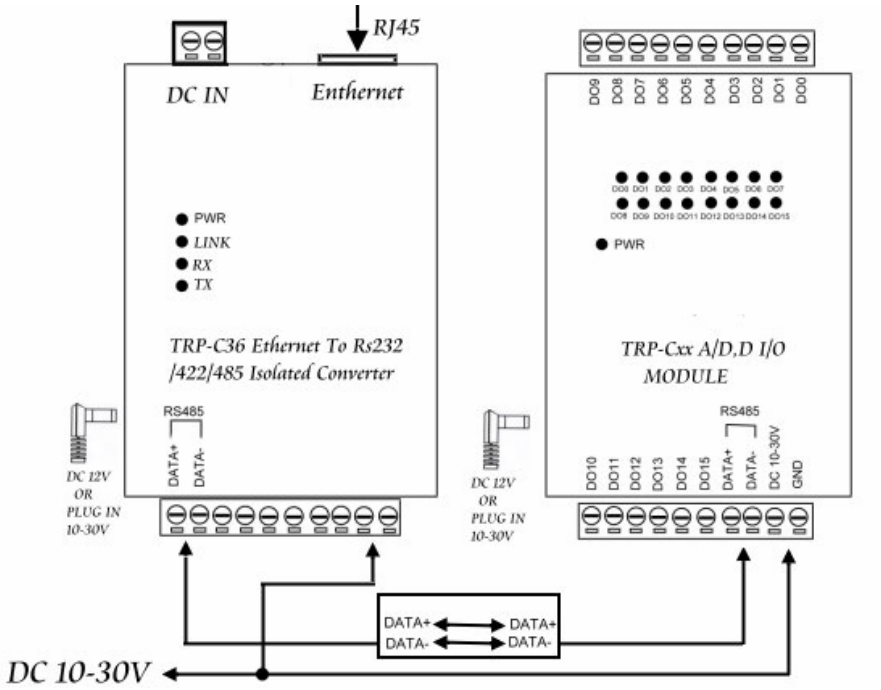
*Support all ASCII and Binary code includes MODBUS RTU/ASCII Protocol in Virtual-com Mode.

TRPCOM Utility is demo utility which may help to test TRP-C37M UART interface .User may find the utility in the TRP-C37M support CD. Double click “TRPCOM Utility”, the installShield

Wizard will guide you complete installation.
User can directly link TRP-C37M to TRP-Serial Remote IO Modules by RS485, The basic wiring connect.

RS485 Test

DATA+ to DATA+, DATA- to DATA-

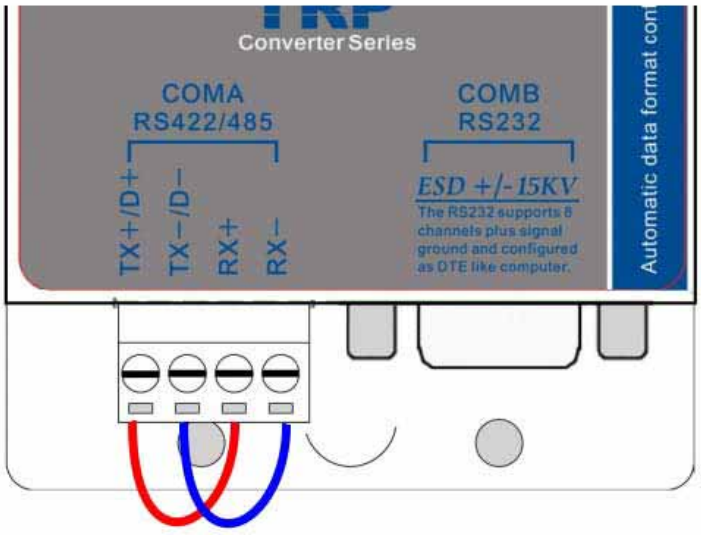


How to operator please see the diagram below.

RS422 Loop back Test

Hardware connects wiring for RS422 loop test.

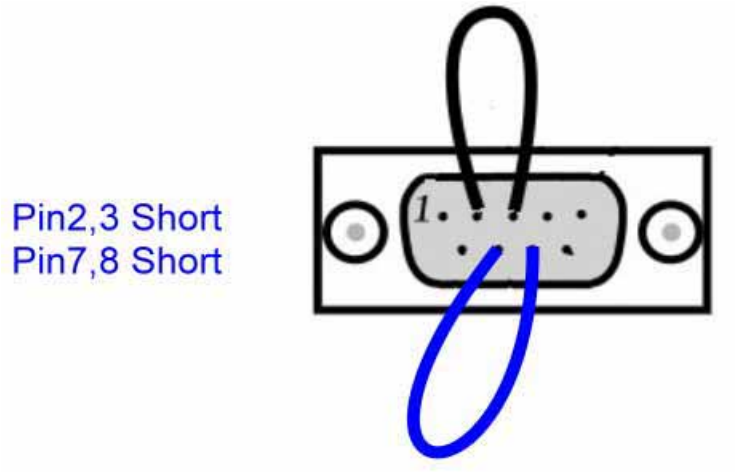
TX+ to RX+, TX- to RX-



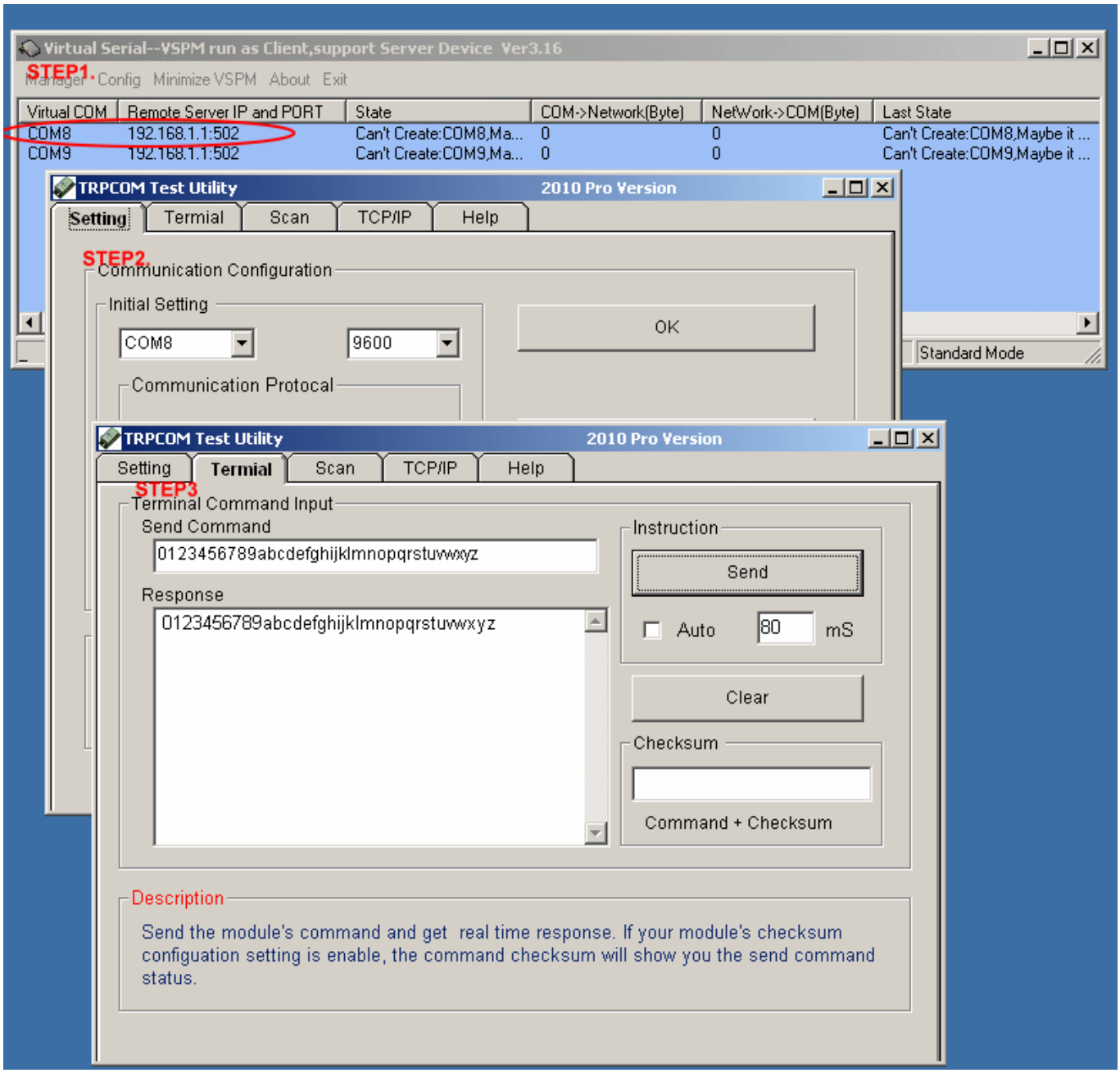
RS232 Loop Back Test

Hardware wiring connection for RS232 Loop Test.

TXD to RXD, RTS to CTS.



STEP1.RUN Virtual COM utility and set up the TRP-C37M IP and PORT.
STEP2.RUN TRPCOM test utility then select virtual-com port number.
STEP3.Select terminal and key-in some word at “send command” text filed.
STEP4.Click “Send Command” and get response.


Virtual Serial--VSPM run as Client,support Server Device Ver3.16
STEP1
Manager Config Minimize VSPM About Exit
Virtual COM
Remote Server IP and PORT
State
COM->Network(Byte)
NetWork->COM(Byte)
Last State
COM8
192.168.1.1:502
Can't Create:COM8,Ma...
0
0
Can't Create:COM8,Maybe it ...
COM9
192.168.1.1:502
Can't Create:COM9,Ma...
0
0
Can't Create:COM9,Maybe it ...
TRPCOM Test Utility
2010 Pro Version
Setting
Termial
Scan
TCP/IP
Help
STEP2
Communication Configuration
Initial Setting
COM8
9600
OK
Communication Protocal
Standard Mode
TRPCOM Test Utility
2010 Pro Version
Setting
Termial
Scan
TCP/IP
Help
STEP3
Terminal Command Input
Send Command
0123456789abcdefghijklmnopqrstuvwxyz
Response
0123456789abcdefghijklmnopqrstuvwxyz
Instruction
Send
Auto
80
mS
Clear
Checksum
Command + Checksum
Description
Send the module's command and get real time response. If your module's checksum configuation setting is enable, the command checksum will show you the send command status.